IEC 61008-1

Edition 4.0 2024-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 1: General rules

Interrupteurs automatiques à courant différentiel résiduel sans dispositif de protection contre les surintensités incorporé pour usages domestiques et analogues (ID) – Partie 1: Règles générales

IEC 61008-1:2024-11 (en-fr)

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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RESIDUAL CURRENT OPERATED CIRCUIT-BREAKERS WITHOUT INTEGRAL OVERCURRENT PROTECTION FOR HOUSEHOLD AND SIMILAR USES (RCCBS) –

Part 1: General rules

FOREWORD

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IEC 61008-1 has been prepared by subcommittee 23E: Circuit-breakers and similar equipment for household use, of IEC technical committee 23: Electrical accessories. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2010, Amendment 1:2012 and Amendment 2:2013. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) harmonization of all clauses between the IEC 61008, IEC 61009 and IEC 60755 series using blocks and modules approach;

b) harmonization of all tables and figures between the IEC 61008, IEC 61009 and IEC 60755 series;

c) terms and definitions are now referred to IEC 62873-2;

d) modification of 4.1 for classification according to supply conditions;

e) new subclauses 8.17 and 9.24 for requirements and tests for the resistance to temporary overvoltages (TOV);

f) improvement of 9.8 for test of dielectric properties;

g) tests for screwless, flat-quick terminals and aluminium conductors are now referred to the IEC 62873-3 series.

The text of this International Standard is based on the following documents:

Draft	Report on voting
23E/1368/FDIS	23E/1385/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This International Standard is to be used in conjunction with the relevant product standard, either IEC 61008-2-1:2024 or IEC 61008-2-2:2024. The chosen standard, IEC 61008-2-1:2024 or IEC 61008-2-2:2024, shall be used consistently throughout the standard.

In order to maintain the same structure throughout the IEC 61008 and IEC 61009 series, some elements that are not applicable to the particular device within the scope of this document are labelled void.

In this document, the following print types are used:

– compliance statements: in *italic* type;

– other statements: in normal type.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 61008 series, published under the general title *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs)*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

The purpose of this document is to harmonize as far as practicable all rules and requirements of a general nature applicable to RCCBs in order to obtain uniformity of requirements and tests and to avoid the need for testing to different standards.

All those parts which can be considered as general have therefore been gathered in this document, e.g. temperature-rise, dielectric properties, etc.

For each type of RCCB, only two main documents are used to determine all requirements and tests:

1) this document;
2) the relevant product standard covering RCCBs:
   - IEC 61008-2-1, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 2-1: RCCBs according to classification 4.1.1*; or
   - IEC 61008-2-2, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 2-2: RCCBs according to classification 4.1.2, 4.1.3, 4.1.4, 4.1.5 and 4.1.6*

For Type F and Type B RCCBs, IEC 62423 applies in addition to the IEC 61008 series.

RESIDUAL CURRENT OPERATED CIRCUIT-BREAKERS WITHOUT INTEGRAL OVERCURRENT PROTECTION FOR HOUSEHOLD AND SIMILAR USES (RCCBS) –

Part 1: General rules

1 Scope

This document gives general requirements and tests for residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (hereafter referred to as RCCBs), for rated operational voltages not exceeding 440 V AC, with rated frequencies of 50 Hz, 60 Hz or 50/60 Hz and rated currents not exceeding 125 A, intended principally for protection against shock hazard.

RCCBs are intended to provide fault protection (previously referred to as protection against indirect contact), the exposed conductive parts of the installation being connected to an appropriate earth electrode. They are also intended to be used to provide protection against fire hazards due to a persistent earth fault current.

RCCBs having a rated residual operating current not exceeding 30 mA are used for fault protection and additional protection in the case of failure of the protective provisions against electric shock.

This document applies to RCCBs performing simultaneously the functions of detection of the residual current, of comparison of the value of this current with the residual operating value and of opening of the protected circuit when the residual current exceeds this value.

NOTE 1 The requirements for RCCBs are in line with the group safety publication IEC 60755.

NOTE 2 RCCBs of type AC and type A are covered by the IEC 61008 series. RCCBs of type F and type B are covered by IEC 62423 in conjunction with the IEC 61008 series.

NOTE 3 Installation and selection rules for RCCBs are given in the IEC 60364 series.

NOTE 4 Installation and application rules of RCCBs in ZA is given in SANS 10142-1.

RCCBs are intended to be operated by ordinary or uninstructed persons and designed not to require maintenance.

The requirements of this document apply for standard conditions (see 7.1). Additional requirements can be necessary for RCCBs used in locations which have severe environmental conditions. RCCBs within the scope of this document are intended for use in an environment with pollution degree 2 (see 7.3).

NOTE 5 For environments with higher pollution degrees, enclosures giving the appropriate degree of protection can be used.

NOTE 6 For RCCBs having a degree of protection higher than IP20, special constructions can be required.

RCCBs are suitable for isolation.

Special precautions (e.g. surge protective devices) can be necessary when excessive overvoltages are likely to occur on the supply side (for example in the case of supply through overhead lines, see IEC 60364-4-44 and IEC 60364-5-53).

RCCBs, with the exception of those with an uninterrupted neutral, are suitable for use in IT systems.

RCCBs of the general type are resistant to current surges, including the case where surge voltages (as a result of switching transients or induced by lightning) cause loading currents in the installation without occurrence of flashover.

RCCBs of type S are considered to be sufficiently resistant against unwanted tripping even if the surge voltage causes a flashover and a follow-on current occurs.

NOTE 7 Surge protective devices installed downstream of the general type of RCCBs and connected in common mode can cause unwanted tripping.

Particular requirements are necessary for RCCBs intended to be used at frequencies other than 50 Hz or 60 Hz.

For RCCBs incorporated in, or intended for association with socket-outlets only, the requirements of this document can be used, as far as applicable, in conjunction with the requirements of IEC 60884-1 or the national requirements of the country where the product is placed on the market.

NOTE 8 Residual current-operated protective devices (RCDs) incorporated in, or intended only for association with socket-outlets, are also covered by IEC 62640.

NOTE 9 In DK, plugs and socket-outlets are in accordance with the requirements of the heavy current regulations section 107.

NOTE 10 In the UK, the plug part associated with an RCCB complies with BS 1363-1 and the socket-outlet(s) associated with an RCCB complies with BS 1363-2. In the UK, it is not necessary for the plug part and the socket-outlet(s) associated with an RCCB to comply with any IEC 60884-1 requirements.

NOTE 11 In ZA, RCCBs are known as earth leakage switches (ELSWs).

This document does not apply to:

– RCCBs the current setting of which is adjustable without a tool;
– RCCBs including batteries.

This document is not intended to be used alone; it is intended to be used in conjunction with the relevant product standard, IEC 61008-2-1 or IEC 61008-2-2.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60060-2, *High-voltage test techniques – Part 2: Measuring systems*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-3-4:2023, *Environmental testing – Part 3-4: Supporting documentation and guidance – Damp heat tests*

IEC 60228, *Conductors of insulated cables*

IEC 60417, *Graphical symbols for use on equipment,* available at https://www.graphical-symbols.info/equipment

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage supply systems – Part 1: Principles, requirements and tests*

IEC 60664-3, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60695-2-10, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 61008-2-1:2024, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 2-1: RCCBs according to classification 4.1.1*

IEC 61008-2-2:2024, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 2-2: RCCBs according to classification 4.1.2, 4.1.3, 4.1.4, 4.1.5 and 4.1.6*

IEC 61032, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 62873-2, *Residual current operated circuit-breakers for household and similar use – Part 2: Residual current devices (RCDs) – Vocabulary*

IEC 62873-3-1, *Residual current operated circuit-breakers for household and similar use – Part 3-1: Particular requirements for devices with screwless-type terminals for external copper conductors*

IEC 62873-3-2, *Residual current operated circuit-breakers for household and similar use – Part 3-2: Particular requirements for devices with flat quick-connect terminations*

IEC 62873-3-3, *Residual current operated circuit-breakers for household and similar use – Part 3-3: Specific requirements for devices with screw-type terminals for external untreated aluminium conductors and with aluminium screw-type terminals for use with copper or with aluminium conductors*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62873-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at https://www.iso.org/obp
- IEC Electropedia: available at https://www.electropedia.org/

3.1
live part
<in electrical installations and equipment> conductive part intended to be energized under normal operating conditions, including the neutral conductor and mid-point conductor, but excluding the PEN conductor, PEM conductor and PEL conductor

[SOURCE: SOURCE: IEC 60050-195:2021, 195-02-19]